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Research Highlights

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Nanoparticles: Target and amplify

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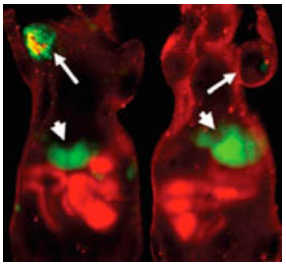
Iron oxide nanoparticles coated with peptides that target tumours can induce clotting, which, in turn, attracts more of them to the site



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For a wound to seal, cell fragments in the bloodstream, known as platelets, home in on the injured site and form a 'platelet plug'. This occurs very rapidly because platelets can amplify their accumulation in the wound through efficient signalling mechanisms. Inspired by this process, researchers at the University of California, Santa Barbara in the USA have now designed a nanoparticle delivery system that can target tumours and amplify their own accumulation.

Erkki Ruoshlatti and colleagues[1 (#B1)] attached a fluorescently labelled tumour-targeting peptide to 50-nm iron oxide particles. The peptide comprises a linear chain of five amino acids (cysteine—arginine—glutamine—lysine—arginine) and was found to bind certain clotting proteins. When injected into mice, the nanoparticles accumulated only in tumour tissues where they induced clots in the blood vessels. Although the binding of nanoparticles to tumour vessels was independent of the associated clotting activity, the clots served to attract more nanoparticles into the tumour and so amplified the targeting effect of the particles.

It is still unclear exactly how the nanoparticles induce clotting, but this strategy can be used to concentrate the particles in tumours to improve detection and imaging. Furthermore, the clotting blocks the blood vessels of tumours so reduces their growth.

References

1. Simberg, D. *et al.* Biomimetic amplification of nanoparticle homing to tumors. *Proc. Natl Acad. Sci. USA* **104**, 932–936 (2007).